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THE PLACE OF SCIENCE IN MODERN CIVILIZATION

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It is commonly held that modern Christendom is superior to any and all other systems of civilized life. Other ages and other cultural regions are by contrast spoken of as lower, or more archaic, or less mature. The claim is that the modern culture is superior on the whole, not that it is the best or highest in all respects and at every point. It has, in fact, not an all-around superiority, but a superiority within a closely limited range of intellectual activities, while outside this range many other civilizations surpass that of the modern occidental peoples. But the peculiar excellence of the modern culture is of such a nature as to give it a decisive practical advantage over all other cultural schemes that have gone before or that have come into competition with it. It has proved itself fit to survive in a struggle for existence as against those civilizations which differ from it in respect of its distinctive traits.

Modern civilization is peculiarly matter-of-fact. It contains many elements that are not of this character, but these other elements do not belong exclusively or characteristically to it. The modern civilized peoples are in a peculiar degree capable of an impersonal, dispassionate insight into the material facts with which mankind has to deal. The apex of cultural growth is at this point. Compared with this trait the rest of what is com-

prised in the cultural scheme is adventitious, or at the best it is a by-product of this hard-headed apprehension of facts. This quality may be a matter of habit or of racial endowment, or it may be an outcome of both; but whatever be the explanation of its prevalence, the immediate consequence is much the same for the growth of civilization. A civilization which is dominated by this matter-of-fact insight must prevail against any cultural scheme that lacks this element. This characteristic of western civilization comes to a head in modern science, and it finds its highest material expression in the technology of the machine industry. In these things modern culture is creative and self-sufficient; and these being given, the rest of what may seem characteristic in western civilization follows by easy consequence. The cultural structure clusters about this body of matter-of-fact knowledge as its substantial core. Whatever is not consonant with these opaque creations of science is an intrusive feature in the modern scheme, borrowed or standing over from the barbarian past.

Other ages and other peoples excel in other things and are known by other virtues. In creative art, as well as in critical taste, the faltering talent of Christendom can at the best follow the lead of the ancient Greeks and the Japanese. In deft workmanship the handicraftsmen of the middle Orient, as well as of the Far East, stand on a level securely above the highest European achievement, old or new. In myth-making, folklore, and occult symbolism many of the lower barbarians have achieved things beyond what the latter-day priests and poets know how to propose. In metaphysical insight and dialectical versatility many orientals, as well as the Schoolmen of the Middle Ages, easily surpass the highest reaches of the New Thought and the Higher Criticism. In a shrewd sense of the religious verities, as well as in an unsparing faith in devout observances, the people of India or Thibet, or even the mediæval Christians, are past-masters in comparison even with the select of the faith of modern times. In political finesse, as well as in unreasoning, brute loyalty, more than one of the ancient peoples give evidence of a capacity to which no modern civilized nation may aspire. In

warlike malevolence and abandon, the hosts of Islam, the Sioux Indian, and the "heathen of the northern sea" have set the mark above the reach of the most strenuous civilized warlord.

To modern civilized men, especially in their intervals of sober reflection, all these things that distinguish the barbarian civilizations seem of dubious value and are required to show cause why they should not be slighted. It is not so with the knowledge of facts. The making of states and dynasties, the founding of families, the prosecution of feuds, the propagation of creeds and the creation of sects, the accumulation of fortunes, the consumption of superfluities—these have all in their time been felt to justify themselves as an end of endeavor; but in the eyes of modern civilized men all these things seem futile in comparison with the achievements of science. They dwindle in men's esteem as time passes, while the achievements of science are held higher as time passes. This is the one secure holding-ground of latter-day conviction, that "the increase and diffusion of knowledge among men" is indefeasibly right and good. When seen in such perspective as will clear it of the trivial perplexities of workday life, this proposition is not questioned within the horizon of the western culture, and no other cultural ideal holds a similar unquestioned place in the convictions of civilized mankind.

On any large question which is to be disposed of for good and all the final appeal is by common consent taken to the scientist. The solution offered in the name of science is decisive so long as it is not set aside by a still more searching scientific inquiry. This state of things may not be altogether fortunate, but such is the fact. There are other, older grounds of finality that may conceivably be better, nobler, worthier, more profound, more beautiful. It might conceivably be preferable, as a matter of cultural ideals, to leave the last word with the lawyer, the duelist, the priest, the moralist, or the college of heraldry. In past times people have been content to leave their weightiest questions to the decision of some one or other of these tribunals, and, it cannot be denied, with very happy results in those respects that were then looked to with the greatest solicitude. But whatever the common-sense of earlier generations may have held in this

respect, modern common-sense holds that the scientist's answer is the only ultimately true one. In the last resort enlightened common-sense sticks by the opaque truth and refuses to go behind the returns given by the tangible facts.

Quasi lignum vitae in paradiso Dei, et quasi lucerna fulgoris in domo Domini, such is the place of science in modern civilization. This latter-day faith in matter-of-fact knowledge may be well grounded or it may not. It has come about that men assign it this high place, perhaps idolatrously, perhaps to the detriment of the best and most intimate interests of the race. There is room for much more than a vague doubt that this cult of science is not altogether a wholesome growth—that the unmitigated quest of knowledge, of this matter-of-fact kind, makes for race-deterioration and discomfort on the whole, both in its immediate effects upon the spiritual life of mankind, and in the material consequences that follow from a great advance in matter-of-fact knowledge.

But we are not here concerned with the merits of the case. The question here is: How has this cult of science arisen? What are its cultural antecedents? How far is it in consonance with hereditary human nature? and, What is the nature of its hold on the convictions of civilized men?

In dealing with pedagogical problems and the theory of education, current psychology is nearly at one in saying that all learning is of a "pragmatic" character; that knowledge is inchoate action inchoately directed to an end; that all knowledge is "functional;" that it is of the nature of use. This, of course, is only a corollary under the main postulate of the latter-day psychologists, whose catchword is that The Idea is essentially active. There is no need of quarreling with this "pragmatic" school of psychologists. Their aphorism may not contain the whole truth, perhaps, but at least it goes nearer to the heart of the epistemological problem than any earlier formulation. It may confidently be said to do so because, for one thing, its argument meets the requirements of modern science. It is such a concept as matter-of-fact science can make effective use of; it is drawn in terms

which are, in the last analysis, of an impersonal, not to say tropismatic, character; such as is demanded by science, with its insistence on opaque cause and effect. While knowledge is construed in teleological terms, in terms of personal interest and attention, this teleological aptitude is itself reducible to a product of unteleological natural selection. The teleological bent of intelligence is a hereditary trait settled upon the race by the selective action of forces that look to no end. The foundations of pragmatic intelligence are not pragmatic, nor even personal or sensible.

This impersonal character of intelligence is, of course, most evident on the lower levels of life. If we follow Mr. Loeb, e. g., in his inquiries into the psychology of that life that lies below the threshold of intelligence, what we meet with is an aimless but unwavering motor response to stimulus.[1] The response is of the nature of motor impulse, and in so far it is "pragmatic," if that term may fairly be applied to so rudimentary a phase of sensibility. The responding organism may be called an "agent" in so far. It is only by a figure of speech that these terms are made to apply to tropismatic reactions. Higher in the scale of sensibility and nervous complication instincts work to a somewhat similar outcome. On the human plane, intelligence (the selective effect of inhibitive complication) may throw the response into the form of a reasoned line of conduct looking to an outcome that shall be expedient for the agent. This is naïve pragmatism of the developed kind. There is no longer a question but that the responding organism is an "agent," and that his intelligent response to stimulus is of a teleological character. But that is not all. The inhibitive nervous complication may also detach another chain of response to the given stimulus, which does not spend itself in a line of motor conduct and does not fall into a system of uses. Pragmatically speaking, this outlying chain of response is unintended and irrelevant. Except in urgent cases, such an idle response seems commonly to be present as a subsidiary phenomenon. If credence is given to the view

[1] Jacques Loeb, *Heliotropismus der Thiere* and *Comparative Psychology and Physiology of the Brain.*

that intelligence is, in its elements, of the nature of an inhibitive selection, it seems necessary to assume some such chain of idle and irrelevant response to account for the further course of the elements eliminated in giving the motor response the character of a reasoned line of conduct. So that associated with the pragmatic attention there is found more or less of an irrelevant attention, or idle curiosity. This is more particularly the case where a higher range of intelligence is present. This idle curiosity is, perhaps, closely related to the aptitude for play, observed both in man and in the lower animals.[2] The aptitude for play, as well as the functioning of idle curiosity, seems peculiarly lively in the young, whose aptitude for sustained pragmatism is at the same time relatively vague and unreliable.

This idle curiosity formulates its response to stimulus, not in terms of an expedient line of conduct, nor even necessarily in a chain of motor activity, but in terms of the sequence of activities going on in the observed phenomena. The "interpretation" of the facts under the guidance of this idle curiosity may take the form of anthropomorphic or animistic explanations of the "conduct" of the objects observed. The interpretation of the facts takes a dramatic form. The facts are conceived in an animistic way, and a pragmatic animus is imputed to them. Their behavior is construed as a reasoned procedure on their part looking to the advantage of these animistically conceived objects, or looking to the achievement of some end which these objects are conceived to have at heart for reasons of their own.

Among the savage and lower barbarian peoples there is commonly current a large body of knowledge organized in this way into myths and legends, which need have no pragmatic value for the learner of them and no intended bearing on his conduct of practical affairs. They may come to have a practical value imputed to them as a ground of superstitious observances, but they may also not.[3] All students of the lower cultures are aware of

[2] Cf. Gross, *Spiele der Thiere,* chap. 2 (esp. pp. 65–76), and chap. 5; *The Play of Man,* Part III, sec. 3; Spencer, *Principles of Psychology,* secs. 533-35.

[3] The myths and legendary lore of the Eskimo, the Pueblo Indians, and some tribes of the northwest coast afford good instances of such idle creations. Cf. various *Reports* of the Bureau of American Ethnology; also, e. g., Tylor, *Primitive Culture,* esp. the chapters on "Mythology" and "Animism."

the dramatic character of the myths current among these peoples, and they are also aware that, particularly among the peaceable communities, the great body of mythical lore is of an idle kind, as having very little intended bearing on the practical conduct of those who believe in these myth-dramas. The myths on the one hand, and the workday knowledge of uses, materials, appliances, and expedients on the other hand, may be nearly independent of one another. Such is the case in an especial degree among those peoples who are prevailingly of a peaceable habit of life, among whom the myths have not in any great measure been canonized into precedents of divine malevolence.

The lower barbarian's knowledge of the phenomena of nature, in so far as they are made the subject of deliberate speculation and are organized into a consistent body, is of the nature of life-histories. This body of knowledge is in the main organized under the guidance of an idle curiosity. In so far as it is systematized under the canons of curiosity rather than of expediency, the test of truth applied throughout this body of barbarian knowledge is the test of dramatic consistency. In addition to their dramatic cosmology and folk legends, it is needless to say, these peoples have also a considerable body of worldly wisdom in a more or less systematic form. In this the test of validity is usefulness.[4]

The pragmatic knowledge of the early days differs scarcely at all in character from that of the maturest phases of culture. Its highest achievements in the direction of systematic formulation consist of didactic exhortations to thrift, prudence, equanimity, and shrewd management—a body of maxims of expedient con-

[4] "Pragmatic" is here used in a more restricted sense than the distinctively pragmatic school of modern psychologists would commonly assign the term. "Pragmatic," "teleological," and the like terms have been extended to cover imputation of purpose as well as conversion to use. It is not intended to criticise this ambiguous use of terms, nor to correct it; but the terms are here used only in the latter sense, which alone belongs to them by force of early usage and etymology. "Pragmatic" knowledge, therefore, is such as is designed to serve an expedient end for the knower, and is here contrasted with the imputation of expedient conduct to the facts observed. The reason for preserving this distinction is simply the present need of a simple term by which to mark the distinction between worldly wisdom and idle learning.

duct. In this field there is scarcely a degree of advance from Confucius to Samuel Smiles. Under the guidance of the idle curiosity, on the other hand, there has been a continued advance toward a more and more comprehensive system of knowledge. With the advance in intelligence and experience there come closer observation and more detailed analysis of facts.[5] The dramatization of the sequence of phenomena may then fall into somewhat less personal, less anthropomorphic formulations of the processes observed; but at no stage of its growth—at least at no stage hitherto reached—does the output of this work of the idle curiosity lose its dramatic character. Comprehensive generalizations are made and cosmologies are built up, but always in dramatic form. General principles of explanation are settled on, which in the earlier days of theoretical speculation seem invariably to run back to the broad vital principle of generation. Procreation, birth, growth, and decay constitute the cycle of postulates within which the dramatized processes of natural phenomena run their course. Creation is procreation in these archaic theoretical systems, and causation is gestation and birth. The archaic cosmological schemes of Greece, India, Japan, China, Polynesia, and America, all run to the same general effect on this head.[6]

Throughout this biological speculation there is present, obscurely in the background, the tacit recognition of a material causation, such as conditions the vulgar operations of workday life from hour to hour. But this causal relation between vulgar work and product is vaguely taken for granted and not made a principle for comprehensive generalizations. It is overlooked as a trivial matter of course. The higher generalizations take their color from the broader features of the current scheme of life. The habits of thought that rule in the working-out of a system of knowledge are such as are fostered by the more impressive affairs of life, by the institutional structure under which the community lives. So long as the ruling institutions are those of blood-relationship, descent, and clannish discrimination, so long the canons of knowledge are of the same complexion.

[5] Cf. Ward, *Pure Sociology*, esp. pp. 437–48.

[6] Cf., e. g., Tylor, *Primitive Culture*, chap. 8.

When presently a transformation is made in the scheme of culture from peaceable life with sporadic predation to a settled scheme of predaceous life, involving mastery and servitude, gradations of privilege and honor, coercion and personal dependence, then the scheme of knowledge undergoes an analogous change. The predaceous, or higher barbarian, culture is, for the present purpose, peculiar in that it is ruled by an accentuated pragmatism. The institutions of this cultural phase are conventionalized relations of force and fraud. The questions of life are questions of expedient conduct as carried on under the current relations of mastery and subservience. The habitual distinctions are distinctions of personal force, advantage, precedence, and authority. A shrewd adaptation to this system of graded dignity and servitude becomes a matter of life and death, and men learn to think in these terms as ultimate and definitive. The system of knowledge, even in so far as its motives are of a dispassionate or idle kind, falls into the like terms, because such are the habits of thought and the standards of discrimination enforced by daily life.[7]

The theoretical work of such a cultural era, as, for instance, the Middle Ages, still takes the general shape of dramatization, but the postulates of the dramaturgic theories and the tests of theoretic validity are no longer the same as before the scheme of graded servitude came to occupy the field. The canons which guide the work of the idle curiosity are no longer those of generation, blood-relationship, and homely life, but rather those of graded dignity, authenticity, and dependence. The higher generalizations take on a new complexion, it may be without formally discarding the older articles of belief. The cosmologies of these higher barbarians are cast in terms of a feudalistic hierarchy of agents and elements, and the causal nexus between phenomena is conceived animistically after the manner of sympathetic magic. The laws that are sought to be discovered in the natural universe are sought in terms of authoritative enactment. The relation in which the deity, or deities, are conceived to stand to facts is no longer the relation of progenitor, so much as that

[7] Cf. James, *Psychology*, chap. 9, esp. sec. 5.

of suzerainty. Natural laws are corollaries under the arbitrary rules of status imposed on the natural universe by an all-powerful Providence with a view to the maintenance of his own prestige. The science that grows in such a spiritual environment is of the class represented by alchemy and astrology, in which the imputed degree of nobility and prepotency of the objects and the symbolic force of their names are looked to for an explanation of what takes place.

The theoretical output of the Schoolmen has necessarily an accentuated pragmatic complexion, since the whole cultural scheme under which they lived and worked was of a strenuously pragmatic character. The current concepts of things were then drawn in terms of expediency, personal force, exploit, prescriptive authority, and the like, and this range of concepts was by force of habit employed in the correlation of facts for purposes of knowledge even where no immediate practical use of the knowledge so gained was had in view. At the same time a very large proportion of the scholastic researches and speculations aimed directly at rules of expedient conduct, whether it took the form of a philosophy of life under temporal law and custom, or of a scheme of salvation under the decrees of an autocratic Providence. A naïve apprehension of the dictum that all knowledge is pragmatic would find more satisfactory corroboration in the intellectual output of scholasticism than in any system of knowledge of an older or a later date.

With the advent of modern times a change comes over the nature of the inquiries and formulations worked out under the guidance of the idle curiosity—which from this epoch is often spoken of as the scientific spirit. The change in question is closely correlated with an analogous change in institutions and habits of life, particularly with the changes which the modern era brings in industry and in the economic organization of society. It is doubtful whether the characteristic intellectual interests and teachings of the new era can properly be spoken of as less "pragmatic," as that term is sometimes understood, than those of the scholastic times; but they are of another kind, being conditioned

by a different cultural and industrial situation.[8] In the life of the new era conceptions of authentic rank and differential dignity have grown weaker in practical affairs, and notions of preferential reality and authentic tradition similarly count for less in the new science. The forces at work in the external world are conceived in a less animistic manner, although anthropomorphism still prevails, at least to the degree required in order to give a dramatic interpretation of the sequence of phenomena.

The changes in the cultural situation which seem to have had the most serious consequences for the methods and animus of scientific inquiry are those changes that took place in the field of industry. Industry in early modern times is a fact of relatively greater preponderance, more of a tone-giving factor, than it was under the régime of feudal status. It is the characteristic trait of the modern culture, very much as exploit and fealty were the characteristic cultural traits of the earlier times. This early-modern industry is, in an obvious and convincing degree, a matter of workmanship. The same has not been true in the same degree either before or since. The workman, more or less skilled and with more or less specialized efficiency, was the central figure in the cultural situation of the time; and so the concepts of the scientists came to be drawn in the image of the workman. The dramatizations of the seqence of external phenomena worked out under the impulse of the idle curiosity were then conceived in terms of workmanship. Workmanship gradually supplanted differential dignity as the authoritative canon of scientific truth, even on the higher levels of speculation and research. This, of course, amounts to saying in other words that the law of cause and effect was given the first place, as contrasted with dialectical consistency and authentic tradition. But this early-modern law of cause and effect—the law of efficient causes—is of an anthropomorphic kind. "Like causes produce like effects," in much the

[8] As currently employed, the term "pragmatic" is made to cover both conduct looking to the agent's preferential advantage, expedient conduct, and workmanship directed to the production of things that may or may not be of advantage to the agent. If the term be taken in the latter meaning, the culture of modern times is no less "pragmatic" than that of the Middle Ages. It is here intended to be used in the former sense.

same sense as the skilled workman's product is like the workman; "nothing is found in the effect that was not contained in the cause," in much the same manner.

These dicta are, of course, older than modern science, but it is only in the early days of modern science that they come to rule the field with an unquestioned sway and to push the higher grounds of dialectical validity to one side. They invade even the highest and most recondite fields of speculation, so that at the approach to the transition from the early-modern to the late-modern period, in the eighteenth century, they determine the outcome even in the counsels of the theologians. The deity, from having been in mediæval times primarily a suzerain concerned with the maintenance of his own prestige, becomes primarily a creator engaged in the workmanlike occupation of making things useful for man. His relation to man and the natural universe is no longer primarily that of a progenitor, as it is in the lower barbarian culture, but rather that of a talented mechanic. The "natural laws" which the scientists of that era make so much of are no longer decrees of a preternatural legislative authority, but rather details of the workshop specifications handed down by the master-craftsman for the guidance of handicraftsmen working out his designs. In the eighteenth-century science these natural laws are laws specifying the sequence of cause and effect, and will bear characterization as a dramatic interpretation of the activity of the causes at work, and these causes are conceived in a quasi-personal manner. In later modern times the formulations of causal sequence grow more impersonal and more objective, more matter-of-fact; but the imputation of activity to the observed objects never ceases, and even in the latest and maturest formulations of scientific research the dramatic tone is not wholly lost. The causes at work are conceived in a highly impersonal way, but hitherto no science (except ostensibly mathematics) has been content to do its theoretical work in terms of inert magnitude alone. Activity continues to be imputed to the phenomena with which science deals; and activity is, of course, not a fact of observation, but is imputed to the phenomena by the observer.[9] This is, also

[9] Epistemologically speaking, activity is imputed to phenomena for the purpose of organizing them into a dramatically consistent system.

of course, denied by those who insist on a purely mathematical formulation of scientific theories, but the denial is maintained only at the cost of consistency. Those eminent authorities who speak for a colorless mathematical formulation invariably and necessarily fall back on the (essentially metaphysical) preconception of causation as soon as they go into the actual work of scientific inquiry.[10]

Since the machine technology has made great advances, during the nineteenth century, and has become a cultural force of wide-reaching consequence, the formulations of science have made another move in the direction of impersonal matter-of-fact. The machine process has displaced the workman as the archetype in whose image causation is conceived by the scientific investigators. The dramatic interpretation of natural phenomena has thereby become less anthropomorphic; it no longer constructs the life-history of a cause working to produce a given effect—after the manner of a skilled workman producing a piece of wrought goods—but it constructs the life-history of a process in which the distinction between cause and effect need scarcely be observed in an itemized and specific way, but in which the run of causation unfolds itself in an unbroken sequence of cumulative change. By contrast with the pragmatic formulations of worldly wisdom these latter-day theories of the scientists appear highly opaque, impersonal, and matter-of-fact; but taken by themselves they must be admitted still to show the constraint of the dramatic prepossessions that once guided the savage myth-makers.

In so far as touches the aims and the animus of scientific inquiry, as seen from the point of view of the scientist, it is a wholly fortuitous and insubstantial coincidence that much of the knowledge gained under machine-made canons of research can be turned to practical account. Much of this knowledge is useful, or may be made so, by applying it to the control of the processes in which natural forces are engaged. This employment of scien-

[10] Cf., e. g., Karl Pearson, *Grammar of Science,* and compare his ideal of inert magnitudes as set forth in his exposition with his actual work as shown in chaps. 9, 10, and 12, and more particularly in his discussions of "Mother Right" and related topics in *The Chances of Death.*

tific knowledge for useful ends in technology, in the broad sense in which the term includes, besides the machine industry proper, such branches of practice as engineering, agriculture, medicine, sanitation, and economic reforms. The reason why scientific theories can be turned to account for these practical ends is not that these ends are included in the scope of scientific inquiry. These useful purposes lie outside the scientist's interest. It is not that he aims, or can aim, at technological improvements. His inquiry is as "idle" as that of the Pueblo myth-maker. But the canons of validity under whose guidance he works are those imposed by the modern technology, through habituation to its requirements; and therefore his results are available for the technological purpose. His canons of validity are made for him by the cultural situation; they are habits of thought imposed on him by the scheme of life current in the community in which he lives; and under modern conditions this scheme of life is largely machine-made. In the modern culture, industry, industrial processes, and industrial products have progressively gained upon humanity, until these creations of man's ingenuity have latterly come to take the dominant place in the cultural scheme; and it is not too much to say that they have become the chief force in shaping men's daily life, and therefore the chief factor in shaping men's habits of thought. Hence men have learned to think in the terms in which the technological processes act. This is particularly true of those men who by virtue of a peculiarly strong susceptibility in this direction become addicted to that habit of matter-of-fact inquiry that constitutes scientific research.

Modern technology makes use of the same range of concepts, thinks in the same terms, and applies the same tests of validity as modern science. In both, the terms of standardization, validity, and finality are always terms of impersonal sequence, not terms of human nature or of preternatural agencies. Hence the easy copartnership between the two. Science and technology play into one another's hands. The processes of nature with which science deals and which technology turns to account, the sequence of changes in the external world, animate and inanimate, run in terms of brute causation, as do the theories of science. These

processes take no thought of human expediency or inexpediency. To make use of them they must be taken as they are, opaque and unsympathetic. Technology, therefore, has come to proceed on an interpretation of these phenomena in mechanical terms, not in terms of imputed personality nor even of workmanship. Modern science, deriving its concepts from the same source, carries on its inquiries and states its conclusions in terms of the same objective character as those employed by the mechanical engineer.

So it has come about, through the progressive change of the ruling habits of thought in the community, that the theories of science have progressively diverged from the formulations of pragmatism, ever since the modern era set in. From an organization of knowledge on the basis of imputed personal or animistic propensity the theory has changed its base to an imputation of brute activity only, and this latter is conceived in an increasingly matter-of-fact manner; until, latterly, the pragmatic range of knowledge and the scientific are more widely out of touch than ever, differing not only in aim, but in matter as well. In both domains knowledge runs in terms of activity, but it is on the one hand knowledge of what had best be done, and on the other hand knowledge of what takes place; on the one hand knowledge of ways and means, on the other hand knowledge without any ulterior purpose. The latter range of knowledge may serve the ends of the former, but the converse does not hold true.

These two divergent ranges of inquiry are to be found together in all phases of human culture. What distinguishes the present phase is that the discrepancy between the two is now wider than ever before. The present is nowise distinguished above other cultural eras by any exceptional urgency or acumen in the search for pragmatic expedients. Neither is it safe to assert that the present excels all other civilizations in the volume or the workmanship of that body of knowledge that is to be credited to the idle curiosity. What distinguishes the present in these premises is (1) that the primacy in the cultural scheme has passed from pragmatism to a disinterested inquiry whose motive is idle curiosity, and (2) that in the domain of the latter the making of

myths and legends in terms of imputed personality, as well as the construction of dialectical systems in terms of differential reality, has yielded the first place to the making of theories in terms of matter-of-fact sequence.[11]

Pragmatism creates nothing but maxims of expedient conduct. Science creates nothing but theories.[12] It knows nothing of policy or utility, of better or worse. None of all that is comprised in what is today accounted scientific knowledge. Wisdom and proficiency of the pragmatic sort does not contribute to the advance of a knowledge of fact. It has only an incidental bearing on scientific research, and its bearing is chiefly that of inhibition and misdirection. Wherever canons of expediency are intruded into or are attempted to be incorporated in the inquiry, the consequence is an unhappy one for science, however happy it may be for some other purpose extraneous to science. The mental attitude of worldly wisdom is at cross-purposes with the disinterested scientific spirit, and the pursuit of it induces an intellectual bias that is incompatible with scientific insight. Its intellectual output is a body of shrewd rules of conduct, in great part designed to take advantage of human infirmity. Its habitual terms of standardization and validity are terms of human nature, of human preference, prejudice, aspiration, endeavor, and disability, and the habit of mind that goes with it is such as is consonant with these terms. No doubt, the all-pervading pragmatic animus of the older and non-European civilizations has had more than anything else to do with their relatively slight and slow advance in scientific knowledge. In the modern scheme of knowledge it holds true, in a similar manner and with analogous effect, that training in divinity, in law, and in the related branches of diplomacy, business tactics, military affairs, and political theory, is alien to the skeptical scientific spirit and subversive of it.

The modern scheme of culture comprises a large body of worldly wisdom, as well as of science. This pragmatic lore stands over against science with something of a jealous reserve. The pragmatists value themselves somewhat on being useful as

[11] Cf. James, *Psychology*, Vol. II, chap. 28, pp. 633–71, esp. p. 640 note.

[12] Cf. Ward, *Principles of Psychology*, pp. 439-43.

well as being efficient for good and evil. They feel the inherent antagonism between themselves and the scientists, and look with some doubt on the latter as being merely decorative triflers, although they sometimes borrow the prestige of the name of science —as is only good and well, since it is of the essence of worldly wisdom to borrow anything that can be turned to account. The reasoning in these fields turns about questions of personal advantage of one kind or another, and the merits of the claims canvassed in these discussions are decided on grounds of authenticity. Personal claims make up the subject of the inquiry, and these claims are construed and decided in terms of precedent and choice, use and wont, prescriptive authority, and the like. The higher reaches of generalization in these pragmatic inquiries are of the nature of deductions from authentic tradition, and the training in this class of reasoning gives discrimination in respect of authenticity and expediency. The resulting habit of mind is a bias for substituting dialectical distinctions and decisions *de jure* in the place of explanations *de facto*. The so-called "sciences" associated with these pragmatic disciplines, such as jurisprudence, political science, and the like, is a taxonomy of credenda. Of this character was the greater part of the "science" cultivated by the Schoolmen, and large remnants of the same kind of authentic convictions are, of course, still found among the tenets of the scientists, particularly in the social sciences, and no small solicitude is still given to their cultivation. Substantially the same value as that of the temporal pragmatic inquiries belongs also, of course, to the "science" of divinity. Here the questions to which an answer is sought, as well as the aim and method of inquiry, are of the same pragmatic character, although the argument runs on a higher plane of personality, and seeks a solution in terms of a remoter and more metaphysical expediency.

In the light of what has been said above, the questions recur: How far is the scientific quest of matter-of-fact knowledge consonant with the inherited intellectual aptitudes and propensities of the normal man? and, What foothold has science in the modern culture? The former is a question of the temperamental heritage

of civilized mankind, and therefore it is in large part a question of the circumstances which have in the past selectively shaped the human nature of civilized mankind. Under the barbarian culture, as well as on the lower levels of what is currently called civilized life, the dominant note has been that of competitive expediency for the individual or the group, great or small, in an avowed struggle for the means of life. Such is still the ideal of the politician and business man, as well as of other classes whose habits of life lead them to cling to the inherited barbarian traditions. The upper-barbarian and lower-civilized culture, as has already been indicated, is pragmatic, with a thoroughness that nearly bars out any non-pragmatic ideal of life or of knowledge. Where this tradition is strong there is but a precarious chance for any consistent effort to formulate knowledge in other terms than those drawn from the prevalent relations of personal mastery and subservience and the ideals of personal gain.

During the Dark and Middle Ages, for instance, it is true in the main that any movement of thought not controlled by considerations of expediency and conventions of status are to be found only in the obscure depths of vulgar life, among those neglected elements of the population that lived below the reach of the active class struggle. What there is surviving of this vulgar, non-pragmatic intellectual output takes the form of legends and folk-tales, often embroidered on the authentic documents of the Faith. These are less alien to the latest and highest culture of Christendom than are the dogmatic, dialectical, and chivalric productions that occupied the attention of the upper classes in mediæval times. It may seem a curious paradox that the latest and most perfect flower of the western civilization is more nearly akin to the spiritual life of the serfs and villeins than it is to that of the grange or the abbey. The courtly life and the chivalric habits of thought of that past phase of culture have left as nearly no trace in the cultural scheme of later modern times as could well be. Even the romancers who ostensibly rehearse the phenomena of chivalry, unavoidably make their knights and ladies speak the language and the sentiments of the slums of that time, tempered with certain schematized modern reflections and speculations.

The gallantries, the genteel inanities and devout imbecilities of mediæval high-life would be insufferable even to the meanest and most romantic modern intelligence. So that in a later, less barbarian age the precarious remnants of folklore that have come down through that vulgar channel—half savage and more than half pagan—are treasured as containing the largest spiritual gains which the barbarian ages of Europe have to offer.

The sway of barbarian pragmatism has, everywhere in the western world, been relatively brief and relatively light; the only exceptions would be found in certain parts of the Mediterranean seaboard. But wherever the barbarian culture has been sufficiently long-lived and unmitigated to work out a thoroughly selective effect in the human material subjected to it, there the pragmatic animus may be expected to have become supreme and to inhibit all movement in the direction of scientific inquiry and eliminate all effective aptitude for other than worldly wisdom. What the selective consequences of such a protracted régime of pragmatism would be for the temper of the race may be seen in the human flotsam left by the great civilizations of antiquity, such as Egypt, India, and Persia. Science is not at home among these leavings of barbarism. In these instances of its long and unmitigated dominion the barbarian culture has selectively worked out a temperamental bias and a scheme of life from which objective, matter-of-fact knowledge is virtually excluded in favor of pragmatism, secular and religious. But for the greater part of the race, at least for the greater part of civilized mankind, the régime of the mature barbarian culture has been of relatively short duration, and has had a correspondingly superficial and transient selective effect. It has not had force and time to eliminate certain elements of human nature handed down from an earlier phase of life, which are not in full consonance with the barbarian animus or with the demands of the pragmatic scheme of thought. The barbarian-pragmatic habit of mind, therefore, is not properly speaking a temperamental trait of the civilized peoples, except possibly within certain class limits (as, e. g., the German nobility). It is rather a tradition, and it does not constitute so tenacious a bias as to make head against the

strongly materialistic drift of modern conditions and set aside that increasingly urgent resort to matter-of-fact conceptions that makes for the primacy of science. Civilized mankind does not in any great measure take back atavistically to the upper-barbarian habit of mind. Barbarism covers too small a segment of the life-history of the race to have given an enduring temperamental result. The unmitigated discipline of the higher barbarism in Europe fell on a relatively small proportion of the population, and in the course of time this select element of the population was crossed and blended with the blood of the lower elements whose life always continued to run in the ruts of savagery rather than in those of the high-strung, finished barbarian culture that gave rise to the chivalric scheme of life.

Of the several phases of human culture the most protracted, and the one which has counted for most in shaping the abiding traits of the race, is unquestionably that of savagery. With savagery, for the purpose in hand, is to be classed that lower, relatively peaceable barbarism that is not characterized by wide and sharp class discrepancies or by an unremitting endeavor of one individual or group to get the better of another. Even under the full-grown barbarian culture—as, for instance, during the Middle Ages—the habits of life and the spiritual interests of the great body of the population continue in large measure to bear the character of savagery. The savage phase of culture accounts for by far the greater portion of the life-history of mankind, particularly if the lower barbarism and the vulgar life of later barbarism be counted in with savagery, as in a measure they properly should. This is particularly true of those racial elements that have entered into the composition of the leading peoples of Christendom.

The savage culture is characterized by the relative absence of pragmatism from the higher generalizations of its knowledge and beliefs. As has been noted above, its theoretical creations are chiefly of the nature of mythology shading off into folklore. This genial spinning of apocryphal yarns is, at its best, an amiably inefficient formulation of experiences and observations in terms of something like a life-history of the phenomena ob-

served. It has, on the one hand, little value, and little purpose, in the way of pragmatic expediency, and so it is not closely akin to the pragmatic-barbarian scheme of life; while, on the other hand, it is also ineffectual as a systematic knowledge of matter-of-fact. It is a quest of knowledge, perhaps of systematic knowledge, and it is carried on under the incentive of the idle curiosity. In this respect it falls in the same class with the civilized man's science; but it seeks knowledge not in terms of opaque matter-of-fact, but in terms of some sort of a spiritual life imputed to the facts. It is romantic and Hegelian rather than realistic and Darwinian. The logical necessities of its scheme of thought are necessities of spiritual consistency rather than of quantitative equivalence. It is like science in that it has no ulterior motive beyond the idle craving for a systematic correlation of data; but it is unlike science in that its standardization and correlation of data run in terms of the free play of imputed personal initiative rather than in terms of the constraint of objective cause and effect.

By force of the protracted selective discipline of this past phase of culture, the human nature of civilized mankind is still substantially the human nature of savage man. The ancient equipment of congenital aptitudes and propensities stands over substantially unchanged, though overlaid with barbarian traditions and conventionalities and readjusted by habituation to the exigencies of civilized life. In a measure, therefore, but by no means altogether, scientific inquiry is native to civilized man with his savage heritage, since scientific inquiry proceeds on the same general motive of idle curiosity as guided the savage myth-makers, though it makes use of concepts and standards in great measure alien to the myth-makers' habit of mind. The ancient human predilection for discovering a dramatic play of passion and intrigue in the phenomena of nature still asserts itself. In the most advanced communities, and even among the adepts of modern science, there comes up persistently the revulsion of the native savage against the inhumanly dispassionate sweep of the scientific quest, as well as against the inhumanly ruthless fabric of technological processes that have come out of this

search for matter-of-fact knowledge. Very often the savage need of a spiritual interpretation (dramatization) of phenomena breaks through the crust of acquired materialistic habits of thought, to find such refuge as may be had in articles of faith seized on and held by sheer force of instinctive conviction. Science and its creations are more or less uncanny, more or less alien, to that fashion of craving for knowledge that by ancient inheritance animates mankind. Furtively or by an overt breach of consistency, men still seek comfort in marvelous articles of savage-born lore, which contradict the truths of that modern science whose dominion they dare not question, but whose findings at the same time go beyond the breaking point of their jungle-fed spiritual sensibilities.

The ancient ruts of savage thought and conviction are smooth and easy; but however sweet and indispensable the archaic ways of thinking may be to the civilized man's peace of mind, yet such is the binding force of matter-of-fact analysis and inference under modern conditions that the findings of science are not questioned on the whole. The name of science is after all a word to conjure with. So much so that the name and the mannerisms, at least, if nothing more of science, have invaded all fields of learning and have even overrun territory that belongs to the enemy. So there are "sciences" of theology, law, and medicine, as has already been noted above. And there are such things as Christian Science, and "scientific" astrology, palmistry, and the like. But within the field of learning proper there is a similar predilection for an air of scientific acumen and precision where science does not belong. So that even that large range of knowledge that has to do with general information rather than with theory—what is loosely termed scholarship—tends strongly to take on the name and forms of theoretical statement. However decided the contrast between these branches of knowledge on the one hand, and science properly so called on the other hand, yet even the classical learning, and the humanities generally, fall in with this predilection more and more with each succeeding generation of students. The students of literature, for instance, are more and more prone to substitute critical

analysis and linguistic speculation, as the end of their endeavors, in the place of that discipline of taste and that cultivated sense of literary form and literary feeling that must always remain the chief end of literary training, as distinct from philology and the social sciences. There is, of course, no intention to question the legitimacy of a science of philology or of the analytical study of literature as a fact in cultural history, but these things do not constitute training in literary taste, nor can they take the place of it. The effect of this straining after scientific formulations in a field alien to the scientific spirit is as curious as it is wasteful. Scientifically speaking, those quasi-scientific inquiries necessarily begin nowhere and end in the same place; while in point of cultural gain they commonly come to nothing better than spiritual abnegation. But these blindfold endeavors to conform to the canons of science serve to show how wide and unmitigated the sway of science is in the modern community.

Scholarship—that is to say an intimate and systematic familiarity with past cultural achievements—still holds its place in the scheme of learning, in spite of the unadvised efforts of the short-sighted to blend it with the work of science, for it affords play for the ancient genial propensities that ruled men's quest of knowledge before the coming of science or of the outspoken pragmatic barbarism. Its place may not be so large in proportion to the entire field of learning as it was before the scientific era got fully under way. But there is no intrinsic antagonism between science and scholarship, as there is between pragmatic training and scientific inquiry. Modern scholarship shares with modern science the quality of not being pragmatic in its aim. Like science it has no ulterior end. It may be difficult here and there to draw the line between science and scholarship, and it may even more be unnecessary to draw such a line; yet while the two ranges of discipline belong together in many ways, and while there are many points of contact and sympathy between the two; while the two together make up the modern scheme of learning; yet there is no need of confounding the one with the other, nor can the one do the work of the other. The scheme of learning has changed in such manner

as to give science the more commanding place, but the scholar's domain has not thereby been invaded, nor has it suffered contraction at the hands of science, whatever may be said of the weak-kneed abnegation of some whose place, if they have one, is in the field of scholarship rather than of science.

All that has been said above has of course nothing to say as to the intrinsic merits of this quest of matter-of-fact knowledge. In point of fact, science gives its tone to modern culture. One may approve or one may deprecate the fact that this opaque, materialistic interpretation of things pervades modern thinking. That is a question of taste, about which there is no disputing. The prevalence of this matter-of-fact inquiry is a feature of modern culture, and the attitude which critics take toward this phenomenon is chiefly significant as indicating how far their own habit of mind coincides with the enlightened common-sense of civilized mankind. It shows in what degree they are abreast of the advance of culture. Those in whom the savage predilection or the barbarian tradition is stronger than their habituation to civilized life will find that this dominant factor of modern life is perverse, if not calamitous; those whose habits of thought have been fully shaped by the machine process and scientific inquiry are likely to find it good. The modern western culture, with its core of matter-of-fact knowledge, may be better or worse than some other cultural scheme, such as the classic Greek, the mediæval Christian, the Hindu, or the Pueblo Indian. Seen in certain lights, tested by certain standards, it is doubtless better; by other standards, worse. But the fact remains that the current cultural scheme, in its maturest growth, is of that complexion; its characteristic force lies in this matter-of-fact insight; its highest discipline and its maturest aspirations are these.

In point of fact, the sober common-sense of civilized mankind accepts no other end of endeavor as self-sufficient and ultimate. That such is the case seems to be due chiefly to the ubiquitous presence of the machine technology and its creations in the life of modern communities. And so long as the machine process continues to hold its dominant place as a disciplinary

factor in modern culture, so long must the spiritual and intellectual life of this cultural era maintain the character which the machine process gives it.

But while the scientist's spirit and his achievements stir an unqualified admiration in modern men, and while his discoveries carry conviction as nothing else does, it does not follow that the manner of man which this quest of knowledge produces or requires comes near answering to the current ideal of manhood, or that his conclusions are felt to be as good and beautiful as they are true. The ideal man, and the ideal of human life, even in the apprehension of those who most rejoice in the advances of science, is neither the finikin skeptic in the laboratory nor the animated slide-rule. The quest of science is relatively new. It is a cultural factor not comprised, in anything like its modern force, among those circumstances whose selective action in the far past has given to the race the human nature which it now has. The race reached the human plane with little of this searching knowledge of facts; and throughout the greater part of its life-history on the human plane it has been accustomed to make its higher generalizations and to formulate its larger principles of life in other terms than those of passionless matter-of-fact. This manner of knowledge has occupied an increasing share of men's attention in the past, since it bears in a decisive way upon the minor affairs of workday life; but it has never until now been put in the first place, as the dominant note of human culture. The normal man, such as his inheritance has made him, has therefore good cause to be restive under its dominion.